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BIOLOGY AND PATHOGENICITY OF TREPONEMES

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ABSTRACTS

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ALL ABSTRACTS ARE ENTERED BY ALPHABETICAL ORDER OF FIRST AUTHOR

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SYPHILIS - A ROLE IN SEXUALLY ACQUIRED AIDS?

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Numerous inconsistencies have been noted in HIV epidemiology between the various risk groups. Clinical signs of HIV infection seem to appear much later in previously healthy heterosexuals. Marked differences in both expression and progression of HIV disease between the sexually and non-sexually acquired forms have been reported. These differences might well be explained by a hypothetical interrelationship between STD's and AIDS thereby explaining the predisposition to HIV infection both in North American homosexuals and the heterosexual population of sub-Saharan Africa.

Extensive historical data supports the role of an STD as a co-factor allowing significant clinical viral expression. Certain aspects of HIV epidemiology may therefore be explained by concomitant infection by treponemes and HIV.

Although the natural history of HIV infection in North American homosexuals is well documented, it appears that infection via non-sexual means results in less serious disease or prolongation of a clinically latent period. This is supported by evidence that infectivity rates of immunologically intact individuals, eg. needle-stick exposures, hemophiliacs and transfusion recipients, are less than that of immunologically impaired transfusion recipients, eg. hypogammaglobulinemia, leukemia, etc. Seroconversions in the immunologically intact groups may carry a less serious prognosis re progression to AIDS. The reported differences between sexually and non-sexually acquired AIDS may result from failure to diagnose treponemal disease either due to the inadequacies of treponemal testing or due to secondary effects of HIV infection.

- a) Of 43 patients in a gay primary practice, 13 reported a history of treatment for syphilis; 6 of these were negative in all syphilis tests (VDRL, MHA-TP, FTA and TPI).
- b) Furthermore, 83 HIV antibody positive homosexual patients, in order of presentation, at an HIV clinic were all VDRL negative; 13 were negative in treponemal tests despite a history of treated syphilis.
- c) To investigate the concomitance of HIV antibody and treponemal antibody status, we tested 100 homosexuals blinded. Only one out of 10 patients with AIDS was treponemal antibody positive.

Treponemal enzymology with special consideration of peptidolysis. K. K. Mäkinen, Department of Biologic and Materials Sciences, University of Michigan, School of Dentistry, Ann Arbor, Michigan, USA.

Treponemes are found in amazingly opportunistic growth environments and they are associated with a considerable array of eukaryotic hosts. Because of this diversity, the number and type of enzymes present in treponemes vary substantially. Many treponemes ferment simple carbohydrates or plant polymers, while others favor nitrogenous substrates, such as proteins, peptides and amino acids. Some treponemes, as T. denticola, exert considerable metabolic versatility, while others are limited with regard to the number of acceptable growth substrates. Some pectinolytic treponemes do not seem to ferment amino acids or neutral sugars. Hydrolytic enzymes produced by treponemes for nutritional purposes (or for defence) are often extracellular or loosely cell-bound. Virtually all treponemes seem to bring about enzymatic depolymerization of macromolecules present in host tissues. It is possible that a part of the pathogenicity of some treponemes is related to the presence of peptidolytic enzymes in these organisms. Of special interest are endopeptidases capable of hydrolyzing gelatin, collagen, collagen-derived peptides and various synthetic substrates with an amino acid sequence similar to that present in collagen. These organisms may contribute to the maintenance of inflammatory situations, even if the organisms are not regarded as primarily virulent. Certain oral treponemes hydrolyze Type IV collagen, other soluble or insoluble collagens, fibrinogen and bioactive peptides. It is surprising how specialized enzymatically some treponemes are and how dominant a role some of the treponemal enzymes play. For example, certain oral strains of T. denticola selectively exhibit high proline imipeptidase activity, while others (as T. vincentii) show high activity only toward N-terminal arginine and γ -glutamyl residues. This selectivity indicates highly specialized enzymatic mechanisms.